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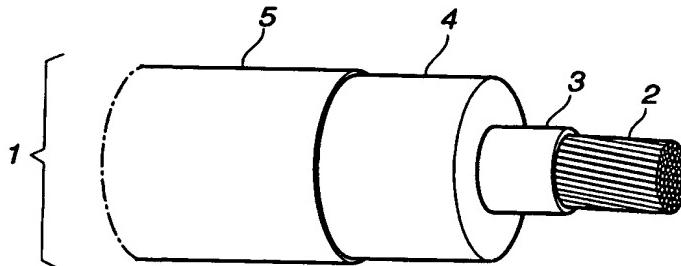
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(54) Title: ROTATING ELECTRICAL MACHINE PLANTS



(57) Abstract

The present invention relates to installations for transformerless generation of HVDC and wherein the installation comprises rotating high-voltage single-winding/multiple-winding machines and converters. The single-winding/multiple-winding machine comprises a magnetic circuit with one or more magnetic cores and one or more windings, phase-shifted in space, which comprise a cable with one or more current-carrying conductors (2), each conductor comprising a number of strands, around each strand there being arranged an inner semiconducting layer (3), around which is arranged an insulating layer (4) of solid insulation, around which is arranged an outer semiconducting layer (5).

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/SE 97/00878

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>		
<b>IPC6: H02J 3/36</b> According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b>		
Minimum documentation searched (classification system followed by classification symbols)		
<b>IPC6: H02J</b> Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched <b>SE,DK,FI,NO classes as above</b>		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
WPI		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 3305225 A1 (BBC AKTIENGESELLSCHAFT BROWN,BOVERI & CIE), 16 August 1984 (16.08.84), page 3, line 34 - page 4, line 4, figures 1,3,4, claim 1, abstract  --	1-15
A	US 4429244 A (P.Z.NIKITIN ET AL), 31 January 1984 (31.01.84), column 1, line 10 - line 58  --	1-15,30,31
A	US 5036165 A (R.K.ELTON ET AL), 30 July 1991 (30.07.91), figure 1, abstract  --	15
X	--	21-31
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.		<input checked="" type="checkbox"/> See patent family annex.
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search	Date of mailing of the international search report	
24 Nov 1997	25 -11- 1997	
Name and mailing address of the ISA / Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86	Authorized officer  Magnus Hjalmarsson Telephone No. + 46 8 782 25 00	

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 97/00878

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5111095 A (J.R. HENDERSHOT), 5 May 1992 (05.05.92), figures 4A,4B --	32,38
X	EP 282876 A2 (KOLLMOGEN CORPORATION), 21 Sept 1988 (21.09.88), figure 1 --	33
X	EP 0677915 A1 (KOLLMORGEN CORPORATION), 18 October 1995 (18.10.95), figure 2, abstract --	35
X	SU 955369 A (GJK), 18 November 1997 (18.11.97), figures 1-4 --	34,36,37
A	--	29,38
A	EP 0120154 A1 (TRENCH ELECTRIC, A DIVISION OF GUTHRIE CANADIAN INVESTMENTS LIMITED), 3 October 1984 (03.10.84), figure 3 -- -----	26

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE97/00878

### Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: 16–20 because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:  
  
See next sheet!
  
3.  Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See next sheet!

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest:

- The additional search fees were accompanied by the applicant's protest.  
 No protest accompanied the payment of additional search fees.

**INTERNATIONAL SEARCH REPORT**

International application No.

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**Box I**

Claims 16-20 relate to a "Rotating single winding/multiple winding machine". These claims, however, are directly hierarchically dependent of claim 15, which relates to an "Installation comprising a converter and a rotating machine". This makes the scope of protection sought unclear and therefore no meaningful search can be carried out regarding these claims (PCT, Article 17(2)(a)(ii)).

**Box II**

The claims represent nine different inventive concepts:

- I: The invention is defined in claims 1-15 and relates to installations comprising electrical motors and converters capable of transforming mechanical torque into direct current and vice versa without utilising intermediate transformers.
- II: The invention is defined in claims 21-31 and relates to electrical machines with windings, comprising conductors surrounded by two semiconducting layers having an interposed insulating layer.
- III: The invention is defined in claim 32 and relates to an electrical machine with a core comprising salient poles and further comprising windings, phase-shifted in space.
- IV: The invention is defined in claim 33 and relates to an electrical machine with an air-gap winding.
- V: The invention is defined in claim 34 and relates to an electrical machine with radial air-gap flux.
- VI: The invention is defined in claim 35 and relates to an electrical machine with axial air-gap flux.
- VII: The invention is defined in claim 36 and relates to a method for manufacturing an electrical machine comprising a flexible winding.
- VIII: The invention is defined in claim 37 and relates to a method for manufacturing an electrical machine comprising windings in the form of a cable, which is threaded into the stator of the machine.
- IX: The invention is defined in claim 38 and relates to a method for manufacturing an electrical machine comprising windings in the form of a cable. The machine includes salient poles around which the cable is wound.

The requirement of unity of invention is fulfilled only when there is a technical relationship among the inventions involving one or more of the same or corresponding special technical features. The special technical features shall also define a contribution which the claimed inventions, considered as a whole, makes over the prior art (PCT, Rule 13).

The claimed inventions do not fulfil this requirement and therefore unity of invention is lacking.

## INTERNATIONAL SEARCH REPORT

Information on patent family members

01/10/97

International application No.

PCT/SE 97/00878

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✓ US 4429244 A	31/01/84	CA	1167898 A	22/05/84
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EP 0120154 A1	03/10/84	NONE		

